REMARKS

This Amendment is responsive to the Office Action dated April 2, 2007. Applicant has amended claims 1, 2, 15, 17, 20, 21, 28, 29, 34, 36-38, 43 and 44. Applicant has added new claims 57-65. Claims 1-65 are pending.

Claim Rejection Under 35 U.S.C. § 101

In the Office Action, the Examiner rejected claims 1-56 under 35 U.S.C. 101 based on the assertion that the claimed invention is directed to non-statutory subject matter.

Applicant respectfully traverses the rejection. Appellant's claims define statutory subject matter for purposes of 35 U.S.C. § 101.

Contrary to the Examiner's assertion, the claims clearly recite a practical application. In so doing, the claimed invention need not physically transform any material or article.[1] Rather, it is sufficient that the claimed invention produce a useful, concrete and tangible result.[2] To that end, the various claims are directed to methods, devices and computer-readable storage media limited to practical application in reestablishing the association of network address information with network clients in a passive optical network (PON).

The subject matter of the claimed invention clearly provides a useful result, e.g., reestablishing the association of network addresses with network clients in a PON upon recovery from a disablement. As described in Applicant's disclosure, storing, retrieving and reestablishing the address associations as claimed may be useful in maintaining associations and avoiding the need to reacquire associations, which may require manual intervention.

The result provided by the claimed invention is also concrete within the meaning of section 101. In particular, the results are concrete in the sense they provide a repeatable, predictable result in reestablishing the association of network address information with network clients in a PON. Accordingly, there should be no question that the claimed invention provides both a useful and concrete result.

In addition, the claimed invention provides a tangible result. Neither section 101 nor the case law require that, to be tangible, a claim be tied to a particular machine or apparatus or

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[1] *AT&T Corp. v. Excel Communications, Inc.*, 50 USPQ2d 1447 (Fed. Cir. 1999).
[2] *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 47 USPQ2d (Fed. Cir 1998).

operate to change articles or materials to a different state or thing.[3] On the contrary, the result must be tangible in the sense that the claimed invention produces a real-world result. Reestablishing the association of network addresses with network clients in a PON surely provides a real-world result, in contrast to a mere abstract idea. The claimed invention is not a mere abstract algorithm, but rather is applied to achieve a concrete, useful and tangible result in a PON. Moreover, many of the claims explicitly recite a passive optical network or a passive optical network device. It is unclear how such a network or device could lack real-word value, in that they plainly exist and are practiced in the real world.

In view of the remarks above, Applicant respectfully requests withdrawal of the rejection under section 101.

Claim Rejection Under 35 U.S.C. § 112

In the Office Action, the Examiner rejected claims 1-56 under 35 U.S.C. 112, first paragraph, in view of the section 101 rejection, stating the claimed invention is not supported by either a specific and substantial asserted utility or a well established utility and one skilled in the art clearly would not know how to use the claimed invention.

Applicant respectfully traverses this rejection for substantially the reasons stated above with respect to the rejection under section 101. The claimed invention clearly provides a useful, concrete and tangible result.

Claim Rejection Under 35 U.S.C. § 103

In the Office Action, the Examiner rejected claims 1-2 and 10 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,065,061 to Blahut et al. ("Blahut") in view of U.S. Patent Application No. 2002/0143968 A1 to Banerjee et al. ("Banerjee"). The Examiner also rejected claims 3-9, 11-13 and 15-19 under 35 U.S.C. 103(a) as being unpatentable over Blahut and Banerjee in view of U.S. Patent Application No. 2002/0016858 A1 to Sawada et al. ("Sawada"). The Examiner rejected claim 14 under 35 U.S.C. 103(a) as being unpatentable over Blahut, Banerjee and Sawada in view of Hirai (US 6,324,577). Finally, the Examiner rejected

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[3] *AT&T Corp. v. Excel Communications, Inc.*, 50 USPQ2d 1447 (Fed. Cir. 1999).

claims 20-56 under 35 U.S.C. 103(a) as being unpatentable under the same rationale as claims 1-19.

Applicant respectfully traverses the rejections. The applied references fail to disclose or suggest the inventions defined by Applicant's claims, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed invention.

Claims 1-19

Blahut and Banerjee

Applicant's independent claim 1, as amended, recites a method performed by a network node coupled to a passive optical network interface and to one or more network clients, the method comprising detecting a disablement of the passive optical network interface, storing in a memory address association information indicating association of network addresses with the network clients upon detecting the disablement, retrieving from the memory the stored address association information upon recovery of the passive optical network interface from the disablement, and reestablishing the association of the network addresses and the network clients based on the retrieved address association information.

In rejecting Applicant's claim 1, the Examiner stated that Blahut teaches detecting a service interruption with respect to a downstream cable link to a cable modem and storing network information of the cable modem in a routing table. The Examiner acknowledged that Blahut does not explicitly teach associating the network addresses and the network clients based on the stored address association information upon recovery from disablement.

However, the Examiner asserted that Banerjee teaches a method for protecting against premature reassignment of an IP address by a service provider server after an interruption in the connection with the initial client such that if the original IP address has not been reassigned to a new client then the IP address is available for reassignment to the original client upon recovery from the interruption. The Examiner stated that it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the features disclosed by Banerjee into the teachings of Blahut. The Examiner further stated that one would have been motivated to combine the references to allow the system to delay reassignment of IP addresses for periods sufficient to eliminate the late arrival of query responses to reassigned IP addresses.

Blahut discusses detecting a service interruption with respect to a downstream <u>cable link</u> to a cable modem (Col. 5, ll. 6-10), and Banerjee discusses monitoring for an interruption or termination of a <u>connection</u> from a requesting client (Para. [0027]). Contrary to the Examiner's assertions, Blahut and Banerjee, either singularly or in combination, fail to teach or suggest disablement of a passive optical network interface, as claimed.

Blahut is directed to a hybrid telephone/cable television (CATV) Internet access system in which a user sends data over a regular telephone modem and receives data over a unidirectional CATV connection. Blahut discloses switching downstream data transmissions to the user's telephone connection in the event that the CATV connection is interrupted.[4] In particular, Blahut describes the use of the telephone connection for downstream transmissions when the CATV connection is disabled.

Although Blahut mentions that the disclosed system may be applicable to a PON, it is unclear how the disclosed system would be applicable. A telephone connection over the public switched telephone network (PSTN), as described by Blahut, is a point to point connection. A CATV connection, as described by Blahut, is unidirectional. Neither is similar to a PON, which is both point-to-multipoint and bidirectional. As such, Blahut fails to disclose detecting a disablement of a PON interface, as required by the Applicant's amended claim 1. Furthermore, the Banerjee reference fails to make any mention of a PON or a PON interface.

Clearly, both references fail to teach detecting a disablement of a <u>passive optical network interface</u>, as required by Applicant's independent claim 1. Moreover, Blahut and Banerjee also do not disclose or suggest the additional features required by claim 1.

For example, Blahut fails to teach storing in a memory address association information indicating association of network addresses with network clients upon detecting a PON interface disablement, as recited by Applicant's amended claim 1. In support of the rejection, the Examiner asserted that Blahut includes the features of Applicant's claim 1 by describing a cable modem data termination system (CMTS) that stores network information of a cable modem (CM) in a routing table. However, the Examiner appears to have misinterpreted the Blahut reference.

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[4] Blahut, column 1, line 53 to column 2, line 4.

Blahut does not describe storing in a memory address association information <u>upon</u> detecting a disablement. In direct contrast, Blahut teaches storing IP addresses of CMs in a <u>routing table</u> stored within the CMTS "for use during a service interruption." [5] At Col. 5, ll. 57-66, the Blahut reference states that the IP addresses may be entered into the routing table statically during administration of the account associated with the user of a PC or may be entered into the table dynamically upon initiation of a connection between a network access server (NAS) and the CM connected to the PC. This is directly contrary to the storage of address association information upon detection of a PON interface disablement.

Moreover, Blahut discloses maintaining a routing table including IP addresses for a PSTN connection and a corresponding CM connection. Importantly, Blahut requires associating the IP address for the PSTN connection with the IP address for the CM immediately upon a user connection to the network. Upstream requests sent over the PSTN require downstream responses sent to the CM. Waiting to associate the IP address for the PSTN connection with the IP address for the CM until detecting a disablement would serve no logical purpose in the Blahut system because the system requires an association to operate. Accordingly, one of skill in the art would actually avoid such a modification in the Blahut system.

As mentioned above, the Examiner recognized that Blahut fails to teach associating the network addresses and the network clients based on the stored address association information upon recovery from the disablement. The Examiner cited Banerjee, however, for such a teaching. The Examiner characterized Banerjee as disclosing a method for protecting against a premature reassignment of an IP address by a service provider server after an interruption in a connection with an initial client. Applicant disagrees with the Examiner's characterization of Banerjee, as well as the proposed modification of Blahut in view of Banerjee.

Banerjee fails to teach retrieving from a memory stored address association information upon recovery of a PON interface from a disablement and reestablishing the association of network addresses and network clients based on the retrieved address association information, as recited by Applicant's amended claim 1. In support of the rejection, the Examiner stated that Banerjee discloses an IP address log and that, upon recovery from an interruption, if the original IP address of a client has not been reassigned to a new client, then the IP address is available for

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[5] Blahut, column 5, lines 42-43.

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reassignment to the original client. The Examiner appears to have misinterpreted the Banerjee reference relative to the requirements of Applicant's claims.

The Banerjee disclosure is directed to a system in which a service provider assigns a temporary IP address each time a client "calls in," i.e., makes a query. In this way, the Banerjee system is able to quickly reassign IP addresses as needed, and thereby conserve its inventory of IP addresses. Notably, the temporary IP address is assigned and recorded when the client makes a query, and not upon detection of a network disablement. Accordingly, like Blahut, Banerjee provides no teaching that would have suggested storing address association information upon detecting a PON interface disablement, nor retrieving from a memory stored address association information upon recovery from disablement and reestablishing the association of network addresses and network clients based on the retrieved address association information.

Banerjee does not describe retrieving from a memory the stored address association information upon recovery from a disablement and reestablishing the association of network addresses and network clients based on the retrieved address association information. Instead, Banerjee discloses reassigning an IP address to a client only if that IP address has not been reassigned to another client first. As described in paragraph [0027], Banerjee addresses a situation in which a client originally associated with a temporary IP address sends a query but then experiences a disconnection. Upon receiving a response to the query from a web server, a service provider in the Banerjee system determines whether the temporary IP address has already been reassigned to another client. If the IP address has not been reassigned, the service provider directs the query response to the original client using the original IP address. If the IP address has been reassigned, however, the original client does not receive a query response, and instead receives an error message.

Banerjee does not describe recovery from a network disablement, much less reestablishing the association of network addresses and network clients based on retrieved address association information, as required by Applicant's amended claim 1. Instead, Banerjee discloses providing a temporary IP address to a client when a query is made, and ensuring a response to the query is directed to the proper client if the IP address has not already been reassigned (Para. [0027]). Accordingly, Banerjee does not contemplate reestablishing the association of network addresses and network clients based on address association information

retrieved from a memory upon recovery from a network disablement. On the contrary, in the Banerjee system, a client remains associated with its temporary IP address until a query is served or the IP address is reassigned.

In addition to the shortcomings in Blahut and Banerjee, when considered alone, it would not have been obvious to modify Blahut in view of Banerjee. For example, it is unclear why one of ordinary skill in the art would have been concerned, per Banerjee, with premature reassignment of an IP address by a service provider in the Blahut system. Unlike Banerjee, Blahut does not appear to contemplate assignment and reassignment of temporary IP addresses when a client makes a query. Instead, Blahut is merely concerned with fall-back from a downstream cable connection to a downstream dial-up connection if the cable connection is disabled.

For at least the reasons given, neither Blahut nor Banerjee disclose the features of Applicant's independent claim 1, which is in condition for allowance. For at least these reasons, Applicant's claims 2 and 10, which depend from claim 1, are also in condition for allowance.

Blahut, Banerjee and Sawada

The Examiner rejected claims 3-9, 11-13 and 15-19 as being unpatentable over Blahut and Banerjee in view of Sawada. Blahut and Banerjee, either singularly or in combination, fail to describe each and every feature of Applicants' independent claim 1. Sawada provides no teaching capable of overcoming the deficiencies of Blahut and Banerjee, and provides no suggestion of the additional features set forth in claims 3-9, 11-13 and 15-19.

For example, Applicant's claim 3 recites sending Address Resolution Protocol (ARP) queries for the network addresses indicated by the address association information, and maintaining the address associations upon receiving ARP responses. The Sawada reference describes using a network address table to forward or discard received packets and using ARP request packets when updating the network address table to determine which user terminals remain connected to the network such that address entries for the user terminals should be maintained within the network address table. The use of ARP request packets in the Sawada reference has nothing to do with determining whether network address associations are still valid following a PON disablement.

Applicant's claim 11 recites tracking a length of time of the network disablement, and updating remaining lease times of address association information in accordance with the length of time of the network disablement. The Sawada reference discusses subtracting the time of the update process for the network address table from the valid time of the address entries. Sawada does not describe updating lease times in accordance with the length of time of a PON disablement.

Neither Blahut, Banerjee nor Sawada disclose the features of Applicant's independent claim 1, which is in condition for allowance. For at least these reasons, Applicant's claims 3-9, 11-13 and 15-19, which depend from claim 1, are also in condition for allowance.

Blahut, Banerjee, Sawada and Hirai

The Examiner rejected claim 14 as being unpatentable over Blahut, Banerjee and Sawada in view of Hirai. Blahut, Banerjee and Sawada, either singularly or in combination, fail to describe each and every feature of Applicants' independent claim 1. Hirai provides no teaching capable of overcoming the deficiencies of Blahut, Banerjee and Sawada, and provides no suggestion of the additional features set forth in claim 14.

Applicant's claim 14 recites canceling one of the associations when the remaining lease time for the respective association is shorter than the length of time of the network disablement. The Hirai reference teaches updating network management information for each node in a network to the newest information based on lease times of IP addresses for clients associated with the nodes. However, instead of canceling associations based on lease times in accordance with a length of time of network disablement, Hirai appears to describe deleting IP addresses if an abnormal state exists for an extended period of time.

Neither Blahut, Banerjee, Sawada nor Hirai disclose the features of Applicant's independent claim 1 and Applicant's dependent claim 14, which are in condition for allowance.

Claims 20-56

The Examiner did not fully examine Applicant's claim 20-56 and instead stated that claims 20-56 recite corresponding claims that contain similar limitations as claims 1-19 and are rejected under the same rationale. The Examiner's statement that claims 20-56 are

corresponding claims to claims 1-19 is only partially correct. While independent claims 20 and 43 may generally correspond to claims 1-19, the other independent claims do not. Independent claims 21, 28, 29, 36 and 37 and their dependent claims contain different sets of limitations than those found in any of claims 1-19. The Examiner did not provide any analysis directly applicable to the sets of limitations in each of claims 21-42.

Each of independent claims 21, 28, 29, 36 and 37 and their dependent claims are in condition for allowance. For example, independent claims 21, 28, 29, 36 and 37, as amended, recite retrieving from a memory stored address association information upon recovery of the passive optical network interface from a disablement and reestablishing the association of network addresses and network clients based on the retrieved address association information. As discussed with respect to claim 1, none of the cited references discloses retrieving from a memory stored address association information upon recovery of a PON interface from a disablement and reestablishing the association of network addresses and network clients based on the retrieved address association information.

In addition, such references do not discuss sending ARP queries to the network clients for the network addresses indicated in the address association information, and maintaining reestablished associations upon receiving ARP responses from the network clients for the network addresses, as recited by claims 21 and 28. The references also do not describe updating remaining lease times indicated by the address association information in accordance with a determined length of time of a network disablement, and reestablishing associations of network addresses with network clients in accordance with the updated address association information, as recited by claims 29 and 36. Likewise, the cited references fail to describe a non-volatile memory that stores a set of address association information associated with a network node that associates network addresses with network clients represented by the network node upon recovery of a PON interface from a disablement, as recited by claim 37.

For at least these reasons, the Examiner has failed to establish a prima facie case for non-patentability of Applicant's claims 1-56 under 35 U.S.C. 103(a). Withdrawal of this rejection is requested.

New Claims

Applicant has added claims 57-65 to the pending application. The applied references fail to disclose or suggest the inventions defined by Applicant's new claims, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed inventions. As one example, the references do not describe storing the address association information within a memory associated with the network node coupled to the network clients, as recited by claim 57 depending from independent claim 1. The references also do not describe retrieving the stored address association information from a memory associated with the network node coupled to the network clients, as recited by claim 60 depending from independent claim 21, and claim 62 depending from independent claim 29.

Furthermore, the references fail to teach detecting a network disablement in which the passive optical network loses state information indicating association of the network addresses to the network clients, as recited by claim 58 depending from independent claim 1, and claim 64 depending from independent claim 43. The references also fail to teach performing the retrieving and reestablishing with substantially no manual intervention, as recited by claim 59 depending from independent claim 1, claim 61 depending from independent claim 21, claim 63 depending from independent claim 29, and claim 65 depending from independent claim 43. No new matter has been added by the new claims.

CONCLUSION

All claims in this application are in condition for allowance. Applicant respectfully requests reconsideration and prompt allowance of all pending claims. Please charge any additional fees or credit any overpayment to deposit account number 50-1778. The Examiner is invited to telephone the below-signed attorney to discuss this application.

Date: By:

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